DOCUMENT RESUME

ED 113 648 95 CG 010 152

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TITLE Needed Research on the Emotions as Variables in Teaching, Learning, and the Development of Social Skills. A Special Report of the USOE-Sponsored Grant Study: Critical Apparisal of Research in the Personality-Emotions-Motivation Domain. IBR Report No. 73-23.
INSTITUTION Texas Christian Univ., Fort Worth. Inst. of Behavioral Research.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
REPORT NO IBR-R-73-23
PUB DATE Jan 73
GRANT OEG-0-70-2665(508)
NOTE 38p.

EDRS PRICE MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS Behavioral Science Research; *Emotional Development; Individual Development; *Interpersonal Competence; *Learning Theories; *Psychological Patterns; *Research Needs; Skill Development; State of the Art Reviews

ABSTRACT

This task group report is one of a series prepared by eminent psychologists who have served as consultants in the U.S.O.E.-sponsored grant study to conduct a Critical Appraisal of the Personality-Emotions-Motivation Domain. In order to achieve the goal of identifying important problems and areas for new research and methodological issues related to them, an approach was followed in which leading investigators in specialized areas were enlisted as members of task groups and asked to reflect on their current knowledge of ongoing research and to identify the research needs in their respective areas. This paper presents a conceptual framework for the study of emotions, describes methods of studying the emotions, and finally, discusses the emotions in relation to some fundamental areas of educational research. (Author/HMV)

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FOREWORD

The task group report presented in the following pages is one of a series prepared by eminent psychologists who have served as consultants in the U. S. Office of Education sponsored grant study to conduct a Critical Appraisal of the Personality-Emotions-Motivation Domain. The study was planned with the advice of an advisory committee including Professors Raymond B. Cattell and J. McV. Hunt (University of Illinois), Donald W. MacKinnon (University of California, Berkeley), Warren T. Norman (University of Michigan), and Dr. Robert H. Beezer (USOE) and follows a topical outline included as an appendix to the present report. In order to achieve the goal of identifying important problems and areas for new research and methodological issues related to them, an approach was followed in which leading investigators in specialized areas were enlisted as members of task groups and asked to reflect on their current knowledge of ongoing research and to identify the research needs in their respective areas. The general plan is to publish these reports as a collection with integration contributed by the editors. It is hoped that these reports will prove to be valuable to research scientists and administrators.

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THE EMOTIONS AS VARIABLES IN TEACHING, LEARNING, AND THE DEVELOPMENT OF SOCIAL SKILLS

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A number of imposing forces have impeded the study of the emotions as variables in teaching, learning, and social development. The lack of emotion research is by no means peculiar to education. It applies to all fields equally. Discrete emotion variables are just beginning to find their way into the mainstream of "behavioral sciences."

We call attention to the name ("behavioral sciences") that is now the most popular designation for the group of disciplines which focus on the individual and social functioning of human beings. We call attention to it because the name itself epitomizes the problem we face in attempting to call attention to the need for research in the area of the emotions. Behavior as it is most commonly understood, and behavioral science as it is seen by such eminent leaders as B. F. Skinner, precludes emotional experience as a variable. Although an emotion has other important components, by rejecting the phenomenological component or

subjective experience, the behavioristic tradition has jeopardized the meaning and significance of all emotion variables.

Of the many forces which have militated against the study of emotions, three stand out. The first of these, and perhaps the most important, is the lack of a viable conceptual framework for the study of emotions. Such a framework not only has to be sufficiently complex and flexible to be adequate scientifically, it has to be acceptable to the investigators who are motivated to study the emotions. One of the chief aims of this paper will be to present a way of conceptualizing the emotions which will be explicit enough to offer the possibility of consistency in defining crucial variables, yet simple and general enough to be acceptable to investigators with different theoretical orientations.

The second factor impeding emotion research is the overriding concern of psychological and social scientists with perceptual and cognitive development. These are legitimate and highly worthwhile areas of investigation. Even if it were possible, there would be little gain in turning investigators away from these important areas and focusing only on the emotion domain. Another aim of this paper will be to show how the emotions interact with perceptual and cognitive processes, influencing them in important ways.

The third force impeding the study of the emotions is the attitude on the part of many that the emotions cannot be studied objectively or systematically, and that they do not yield to

investigation by the usual methodologies and procedures of science. A related attitude held by some is that, while it may be possible to study the emotions, their very nature makes the undertaking highly expensive and time-consuming. Another aim of this paper will be to indicate some methods of studying the emotions that are quite feasible and probably no more expensive than a number of other types of educational research. In the final section of this paper, we shall discuss some of the core problems in educational research and suggest some approaches and techniques for the study of the role of the emotions in learning, memory, and the development of social skills.

I. A Conceptual Framework for the Study of the Emotions

We want to emphasize that we are not trying to present a rigorous theory of the emotions or to impose any theoretical orientation upon emotion research. We are delineating a number of propositions that are common denominators among a number of current approaches to the study of emotion. It is important to recognize that most approaches do not specify all of these concepts and that any given proposition may be much more important in one approach than in another. Despite these problems, it is in the interest of promoting a more concerted effort in the area of emotion research and of establishing an acceptable taxonomy of principles and variables that we state these propositions. Without greater consistency in the definition of emotion concepts and emotion variables the comparability of findings from one

investigation to another will remain in doubt at best. The seven propositions that follow are by no means intended to be a complete set. It is hoped that they will provide a fruitful beginning.

A. Discrete emotions exist and can be studied by different approaches

All people, including the most rigorous behavioral scientists, speak of phenomena such as joy, sadness, anger, fear, and shame. Common sense tells us that these emotions are existential reals. In addition to the wisdom of common sense, at least six different theories or approaches recognize discrete emotions and the need for studying them. Webb (1948) and Brown and Barber (1951) showed in cogent detail how frustration or anger could be treated as an intervening variable within the s-r theoretical framework. Mowrer (1960) acknowledged the existential reality of the subjective phenomena of fear and anger and related them systematically to his revised two-factor learning theory. Arnold (1960a, 1960b) maintained that there were a number of distinct emotions, each with its own unique neurophysiological substrate and experiential characteristics. Gellhorn (1964) pointed out that different emotions exist and that one of the important differentials was striate muscle activity, particularly facial expression. Jacobson (1929, 1967) has also emphasized the role of striated muscle activity in different emotions. Lazarus and his colleagues (Lazarus & Averill, 1972; Lazarus, Averill, & Opton, 1970) have recognized the existence of different emotions and have emphasized their differentiation on the basis of response

characteristics. Tomkins (1962, 1963) and Izard (1971, 1972) have defined nine discrete or fundamental emotions. They defined an emotion as having neurological, behavioral-expressive, and subjective or phenomenological components. They showed that emotion may be studied in terms of any of these three components but consider all three components as integral to the emotion process.

B. Each of the emotions affects the individual differently

Common sense and most of the current approaches to the study of emotion recognize that the feeling of joy is different from the feeling of sadness, and that our behavior when we are angry is usually different from our behavior when we are afraid or ashamed. Some approaches would look for differences in the situation as appraised by the individual, some for differences in response characteristics, some for differences in the subjective experience. In any case, different emotions are associated with different perceptions, experiences, expressions, cognitions, and motor responses.

C. Emotions often occur in combinations or patterns

While it is highly important to recognize the existence of different emotions, each affecting our experiences and our actions differently, it is also important to recognize that day-to-day life-situations often elicit more than one emotion and that one emotion can, in fact, elicit another. A recent analysis of several different theoretical conceptualizations of anxiety showed that virtually every substantive definition of that term included

more than one fundamental emotion. The definition of Sarason and his associates (Sarason, Davidson, Lighthall, Waite, & Ruebush, 1960) involved the discrete emotions of fear, shame or guilt, distress, and anger. Grinker and Spiegels' (1945) definition included fear and distress. Sullivan (1953) used fear, distress, and shame in his definition and Epstein (1972) incorporated the latter two. Spielberger (1966) alludes to both fear and guilt in his discussion of anxiety. Guilt or shame is also mentioned in the definitions of Basowitz, Persky, Corchin, and Grinker (1955), Katz and Ziegler (1967), and Maher (1966). Cattell (1966) defined anxiety as a second order factor with first order components such as ego weakness, ergic tension, guilt proneness, defective integration of the self-sentiment, and protension or suspicion. Cattell's guilt proneness can certainly be seen as a function of a discrete emotion, as can protension or suspicion (fear). The analysis of substantive definitions of anxiety pointed out that what has often been considered as a unity is in fact a combination or pattern of emotions. Recent empirical studies have validated this pattern- or combination-of-emotions conception of anxiety and depression (Izard, 1972).

D. Emotions are complex phenomena

Even a discrete fundamental emotion has more than one component. When we have the subjective experience of anger we may also be aware of a hot flushed feeling in our face, pounding of our heart, and tension in our muscles. And surely both the

subjective experience and the bodily changes have neural substrates. Thus it seems that it would be generally accepted that an emotion has neural, behavioral-expressive, and experiential components. The reason for controversy in this area is that different approaches have focused on one or the other of these components, and some have even defined emotion in terms of only one of them. Research on any one of these components is certainly legitimate, but it may not throw light on the overall emotion process as it affects individual and social behavior.

E. Emotions have a social (public) aspect

While the experience of an emotion is completely personal, it's behavioral-expressive component (particularly patterning on the face) is public and social. The meaning of emotional expressions was long a controversial subject in psychology. This controversy has recently been resolved. The work of Ekman (1972) and Izard (1971) has shown conclusively that several discrete emotions are universal (pancultural) phenomena. Both the encoding and decoding of these emotion expressions are the same for people all over the world regardless of culture, language, or educational background. The importance of this finding here is that it points up the potential importance of the study of emotion (nonverbal) communication in the educational process.

Beginning in adolescence, social pressure tends to lead the individual to inhibit or conceal the viridical expressions of the emotions. However, suppression or disguise is rarely the case for infants and young children, and rarely completely

successful for adolescents or adults. Generally the child's emotions are written plainly on the face. More often than not the teacher's face also reveals her emotions, perhaps more than her words. And words that say one thing coupled with expressions that say another create dissonance or conflict in the child.

F. Positive emotional experiences are important in individual and social developments

Spitz and Wolf (1946) argued that the emotions play a pioneering role in the general development of the infant and in "every human activity, be it perception, physical proficiency, memory, inventiveness, or understanding [p. 94]." Bowlby (1953) and Golfarb (1955) have shown that institutionalized children who lack the positive emotional interactions of a normal mother-infant relationship suffer grave consequences. Kistiakovskaia (1965) found evidence that led her to conclude that the timely appearance of positive emotional responses in the infant is of great significance to the neural, mental, and physical development of the child. Walters and Parke (1965) reviewed research on the determinants of social responsiveness and concluded that vision and other stimulations such as vocalization and facial expression directed toward the infant played a much more important role than did the meeting of the infant's physiological needs. Wolff (1963) showed that the positive emotional expression of smiling established a social bond between the mother and her offspring. The fact that the human face proves to be the generally most effective stimulus for eliciting a smile is consistent with the conclusion that facial expression as the public aspect of emotion

constitutes the cornerstone of social responsiveness, emotional attachments, and meaningful interpersonal affective ties.

G. Emotions interact with perceptions, cognitions, and actions

Support for this proposition comes from many sources and many different theoretical orientations. Arnold (1960a, 1960b), and most of the other cognitive theorists who deal with emotion, consider a cognitive process, appraisal, as the cause or as the initial step in the sequence of events that constitute emotion. Spitz (1965) has argued that affect precedes and paves the way for perceptual and cognitive development and that the development of perception remains closely linked with affect. He concluded: "ultimately, affects determine the relation between perception and cognition [p. 85]." A good deal of experimental work on perception (for example, Bruner & Goodman, 1947; Levine, Chein, & Murphy, 1942; Sanford, 1936, 1937) showed that needs (some of which may be considered as affective in nature) intrude on and distort perception. More recently emotion theorists (Tomkins, 1962, 1963; Izard & Tomkins, 1966; Izard, 1971, 1972) have presented both theory and empirical evidence relating to the interactions of emotion, perception, and cognition.

II. Methods of Studying the Emotions

As indicated in the foregoing statement of concepts, emotions are generally recognized as complex phenomena. A number of investigators recognize the three basic components: neural, behavioral-expressive, and experiential. Thus the study of

emotion may take place at any of three levels, each level corresponding to one of the basic components of the emotion process. Methods and techniques of investigation are dictated in large measure by the components being studied.

A. Research on the Neurophysiological Level

Studies of the role of the brain and the central nervous system in emotion are basic to the advancement of the science of emotions. Although considerable progress is being made in the general area of brain and behavior, relatively little effort is being extended in the study of brain and emotion. Although research at the neurophysiological level may not be considered germane to the educational process, its general importance to the field warrants a brief discussion of some of the major techniques being used at this level.

1. Surgical ablations and lesions. The investigator hypothesizes about the role of a particular brain mechanism in emotion and then proceeds to remove or damage this brain area. The effects of the ablation or lesion on behavior are then observed. This technique is, of course, confined to animal research. After many years of investigation of this sort, a number of investigators have concluded that this approach is crude. Ablations and lesions are almost always imprecise and it is therefore difficult to draw conclusions regarding relationships of particular brain areas to specific emotional responses, or the lack of them.

2. Micro-electrode implantations. This technique represents a considerable technological advance over ablations and lesions. Micro-electrodes can be implanted with considerable precision, and conclusions regarding the role of particular brain areas in different emotional responses can be made with considerably more confidence.

3. Psychophysiological studies. Much of the research under this heading has used indices of autonomic nervous system functioning as dependent measures. Since the autonomic nervous system may be involved in a host of things other than the emotion process, peripheral measures of autonomic activity are not very promising as a method of studying the emotions. More importantly, since the work of Cannon it has been well established that the role of the autonomic nervous system in emotion is by no means primary. It is a secondary or auxiliary system in the emotion process.

Some research, based on peripheral measures of neurophysiological functioning, especially investigations using adequate electroencephalographic or electromyographic equipment, may prove useful in the study of emotion. This would be particularly true if the investigator has effective techniques for monitoring, via self-report, the specific emotions which are dealt with.

B. Studies at the behavioral-expressive level

The term "behavioral-expressive" is used to describe the component of emotion which is observable primarily in facial behavior and secondarily in postural and vocal behavior. The

term does not refer to instrumental, motor, or locomotor responses subsequent to the intraperson emotion process. A number of research techniques focusing on expressive behavior promise to be quite fruitful in educational research. Confidence in the validity and usefulness of such techniques has been substantially increased by recent evidence establishing the universality of fundamental emotion expressions (Ekman, 1972; Izard, 1971). Essentially two types of study are appropriate in this area: studies of the function of expressing (encoding) emotions, and studies of the recognition (decoding) of the cues or signals of emotion expression.

1. Techniques for studying emotion expression. Studies of this type fall into two groups: studies of (a) voluntary expression and (b) involuntary or spontaneous expression. Very little research has been done on children's ability to produce a particular facial expression of an emotion on request. Although Goodenough (1932) and Thompson (1941) showed that facial expressions develop in congenitally blind children in near-normal fashion, Dumas (1932, 1948) found that the voluntary expressions of the congenitally blind were considerably inferior to the voluntary expressions of normals. Kwint (1934) showed that children's ability to execute various facial movements (components of discrete expressions) develop in a rather regular fashion during the growing years.

More recently Odom and Lemond (1972) studied developmental differences in the perception (decoding) and production (encoding)

of facial expressions in children ages 5 (kindergarten) and 10 (fifth grade). They found a substantial difference between children's ability to produce an expression and their ability to recognize an expression. The lag in ability to produce expressions on request did not decrease with increasing age. The authors noted that the lag demonstrated in this study paralleled the lag data associated with language and figure production.

2. Recognition or discrimination of emotion expressions. Studies of children's ability to recognize emotion expressions can be studied by use of live models especially trained to portray the discrete emotion expressions or by use of standardized photographs or movies of the expressions. A number of cross-culturally standardized sets of photographs of facial expressions are now available (see Ekman, 1972, and Izard, 1971). Various specific techniques for utilizing standard stimulus photographs in the study of expression discrimination have been discussed by Savitsky and Izard (1971) and Odom and Lemond (1972).

3. Naturalistic observation of emotion expression. The method of naturalistic observation may be the one which will have the greatest payoff. A number of possibilities for the use of this method will be discussed in the final section of this paper. Use of naturalistic observation means that the investigator will be recording the emotion as it occurs. Such data provide the possibility of determining what it is in the teacher's behavior and in the school situation that elicit the various positive and negative emotions which vitally affect the educational process.

There are two procedures for implementing the method of naturalistic observation. One is to train observers to use a standardized behavior observation scale for recording the appearance and sequences of various emotions as they occur in the different children being studied. This method has certain limitations. Haggard and Isaacs (1966) showed that discriminable, micromomentary emotion expressions occurred within a period of approximately 1/8th of a second and went unnoticed by observers, who were experienced psychiatrists. In addition to the possibility of missing a certain amount of data, live observations can be made by a single observer on a relatively small number of children. The number of children that may reliably be observed will depend on the comprehensiveness of the observation scale.

The second procedure for implementing naturalistic observation is by use of videotape recording. Videotape recording of childrens' facial expressions in various classroom, study hall, and playground activities can provide a comprehensive and completely accurate record of all events captured on the tape. Trained observers can then play and replay the tapes in order to obtain reliable data on standardized observation scales. On the surface, videotaping may sound like a cumbersome and expensive procedure. However, the possibilities for developing a videotape schedule that would obtain representative samples of teacher-child and child-child interactions in the various school situations and the improved logistics made possible by the

capacity to store and retrieve the taped record as needed, may make it possible to complete certain types of research more validly and less expensively in the long run.

C. Methods of studying emotion experience (phenomenology of emotion)

Usually when we study emotion at the neurophysiological or behavioral-expressive level we are studying an emotion process that includes "felt-emotion" or emotion experience. Certainly when we are observing the spontaneous expression of emotions in children in day-to-day school situations we are also obtaining indices of their inner experiences. Nevertheless it is appropriate to give a separate place to certain techniques for more direct analysis of the subjective experience of emotion.

Several adjective check lists or scales have been used to get immediate self-report of emotion experience (see Izard, 1972; Nowlis, 1965, Zuckerman, 1960). These scales have most frequently been used with college students though some of them have been used in research in the high school. The one by Izard (Differential Emotion Scale) has been tentatively adapted for elementary school children and further work on the development of this adaptation is under way.

Various inventories have been used in studies of anxiety in children. Prominent examples are the anxiety tests used by Sarason and his colleagues (Sarason, Lighthall, Davidson, Waite, and Ruebush, 1960). The advantage of these scales is that they have been proven useful with elementary school age children. A disadvantage is the fact that the scales deal with anxiety as an

entity rather than as a pattern of discrete emotions. An inventory used by Izard (1971) attempts to measure the extent to which each of several discrete emotions occur in different social situations. This latter instrument was standardized on college students but has been adapted in experimental form for children of third grade level and higher.

Another highly promising method for the study of emotional experience in children consists of analyses of children's fantasy and imaginative play. A variety of techniques for the study of fantasy, imaginative play, and the association of these with the emotions has been presented by Klinger (1971) and Singer (1973).

III. The Emotions in Relation to Some Fundamental Areas of Educational Research

Much of educational research, like research in many other areas, has not focused on emotion or emotion-related variables. This is true despite the fact that research on such topics as teacher effectiveness has often produced empirical evidence of the presence of an affective factor. However, quite often researchers were not interested in the finding that the teacher's likeability and capacity to excite students had some bearing on teacher effectiveness. Personal experience and common sense tell us that the teacher who impresses students favorably, captures their interest, and involves them in educational tasks that they find exciting is the effective teacher.

A. Emotion indices of teacher and school effectiveness

One approach to the study of teacher and school effectiveness would be to monitor the behavioral-expressive aspects of children's emotions in relation to the teacher and to the subject matter, or what is taught. Either the method of live observers or video-taping would be appropriate.

It would be necessary to set up ways of determining which emotion responses were to the teacher as a person and which were to the learning process or the subject matter. One way of doing this would be to analyze sequences of emotion responses as they occur in different classroom conditions. For example, a child who constantly smiles at the teacher may find the teacher very likeable but may not be excited about the learning process or the subject matter. There should be variation in emotion expression depending upon what the teacher is saying and doing. A sequence such as surprise, distress, excitement, enjoyment, might indicate that some difficult problem had caught the student's interest, been found challenging, and that finding the solution was enjoyable. The distress could arise from the student's concern over the problem of finding a solution. And indeed without some indication of negative affect there may be some question as to whether the child had really been challenged.

B. Emotion responses to differing school situations

Studies of both emotion expression via observation or videotaping and studies of emotional experience by way of self-report scales and inventories should prove fruitful in ecological

studies of the affective atmosphere of such environments as the classroom, the study hall, and the playground. One might expect somewhat different emotions in these three environments, even in the ideal school. On one end of the continuum, one might find only negative emotions in the classroom, mostly negative emotions in the study hall, with positive emotions exhibited only on the playground. In the latter situation, even the playground might be the source of a greater than desirable amount of negative emotion and aggressive behavior. Studies could be aimed at delineating a set of gradients for positive and negative emotions in different school environments. In addition to expressive behavior and indices of emotion experience, the children's participation in fantasy games, and imaginative play should prove a rich source of data on the emotions as they relate to the different school environments.

C. <u>The emotions, fantasy, and imaginative play as variables in learning and memory</u>

The first question facing investigators in this area is an ideological one. The question is whether one believes that emotion should be the reward of learning or an accompaniment of learning. Right-wing ideology says that emotion is at best something which is the dessert after you do the work. If it is to be included at all in the educational process it should be the reward for a job well done. Left-wing ideology says that emotion must be present as a sign of an effective learning experience. The emotional experience is a necessary ingredient in education if what is learned is to be an integral part of the

person. In some instances the emotional experience may even be viewed as a substitute for learning.

The right-wing and left-wing ideological positions are the extremes and it is our view that it would be more appropriate to take a middle-of-the-road position. Thus educators should insist both on meeting the criteria of excellence in learning and on optimizing appropriate emotional experiences before, during, and after meeting such criteria.

We think it would be misleading to indicate that positive emotional experiences should be maximized in the classroom and other school situations. The reason for this is that we do not believe there can be any deep and enduring commitment to learning or to any other enterprise in the absence of negative emotions. Commitment is probably produced by an optimal ratio of positive and negative emotions such that the individual becomes progressively more willing to assume greater and greater risks and greater and greater intensities of negative emotions (e.g., distress, shame, fear) in order to attain higher and higher goals or the desired ends. The process of such attainment, as well as the end goal, will prove proportionately more and more exciting and enjoyable (rewarding), enabling the individual to tolerate greater and greater negative emotion, or even pain, as of fatigue. Learning, whether in elementary subjects or in areas of great significance to the individual and to society, is not always easy or fun. Some of the most important lessons, in and out of school, require not only effort but the sacrifice

of comfort and joy. The difficulty we experience in learning may cause us to feel distress or even anger. Inability to cope with the problem may elicit shame, and in the face of uncertainty and ambiguity we may experience fear. These and other negative emotions are inevitable accompaniments in difficult learning tasks, and in the attainment of the highest goals. Thus it would be deceptive to say that the education process should have as one of its goals the maximizing of positive emotional experiences. A more appropriate statement of the goal would say that the educational processes should aim toward optimizing the ratio of positive and negative emotional experiences. In implementing this goal the dosing or grading of learning tasks should take into account the physical, intellectual, and emotional stage of development of the particular child.

It is not possible to delineate all the factors which must be taken into account in implementing this goal but we would like to emphasize two important ingredients. First, beginning in nursery school, kindergarten, and on through early years of elementary school, children should be given learning tasks that provide training in tolerating negative emotions. The stages of development of the child's different personality subsystems and the teacher's intuitive knowledge of the individual will have to serve as guides in selecting tasks that offer the right balance of positive and negative emotional experiences. Second, fantasy games and imaginative play, particularly in nursery

school, kindergarten, and the early grades of elementary school, should be a regular part of the educational program. Singer has shown that regular participation in fantasy games is associated with characteristics favorable to learning. It is quite reasonable that fantasy and imaginative play would be extremely useful in helping the child to learn to tolerate negative emotional experiences, as well as to learn to avoid distracting and disrupting factors in the environment.

1. Emotions in learning and memory. Some of our own research has shown that there is a relationship between the type of emotion accompanying a learning situation or experience and the long-term memory of the event or of what was learned. Much research is needed however to determine more precisely the relationships between specific emotions, the learning process, immediate and long-range memory. A variety of types of study needs to be undertaken. For example, one type of study might aim toward investigating the relationship between the emotions expressed on the face of the learner during the acquisition and processing of information on the one hand, and the quality and quantity of what is stored in memory on the other. Learning tasks and emotion variables will obviously need to be determined in relation to the child's stage of development.

2. Fantasy and imaginative play in learning and memory. The work of Klinger (1971) and Singer (1973) has shown that participation in fantasy and imaginative play has important implications for learning, memory, and creativity. Klinger's

work indicates that fantasy serves a number of adaptive functions, such as facilitating the organization and retrieval of information. Fantasy may even bring about a creative recombination of informational units. Singer has shown that children who participate in fantasy games are rated higher on concentration.

Singer has also pointed out that images enhance learning and that imagery comes in part out of make-believe play. Certainly in working with children in kindergarten, and first and second grade, developing the child's capacity for fantasy and socio-dramatic activity can facilitate learning in two ways. The games may have substance which contributes to the curriculum, and at the same time they put the content in a context that is interesting and challenging to the children. Particularly with children from lower socioeconomic levels, the use of fantasy games and imaginative play should serve to increase their involvement and commitment to the educational process.

There are several other ways in which fantasy and imaginative play produce positive effects. Fantasy and imaginative play can serve as a means of rehearsal of material which has been exposed to the child but not fully mastered or integrated. As in the case of the emotions we need to seek to optimize fantasy and imaginative play rather than maximize them. These tools are perhaps most important from nursery through early elementary grades, but to some extent they may characterize learning throughout life. Poincaré considered the discipline of mathematics as

the finest type of human play. He thought that in this domain the person is most free because he constructs the entities of mathematics entirely from his imagination.

Since there is increasing evidence of the importance of the role of imagery in the learning process, it would follow that the use of imaginative games might enhance the imagery capacity of children and prepare them better for a variety of learning situations. The use of one's fantasy play capacities may increase toleration of delay by providing positive stimulation and positive emotional experience during the many periods of waiting that are part of the school situation. Many children untrained in the use of their own imaginative capacities for self stimulation and self control are likely to engage in disruptive acts during such waiting periods with subsequent negative consequences for themselves. Of course, teachers must be prepared to develop children's fantasy and imaginative play in a constructive fashion. Thus there is a need for research on the training of teachers in the use of fantasy games, and in the generating and detecting of appropriate emotions in children.

It would not be desirable for a child in the classroom or any other school situation to participate in fantasy and imaginative play all the time. Contrariwise the child who sits with his face and his attention directed toward the teacher and the things she says without ever taking time for reverie or fantasy may not be really integrating anything completely. The gaze patterns of children in relation to the teacher may actually

reveal something with regard to the way they are processing or failing to process information. The shifting of the gaze away from the teacher may provide the child with the opportunity to rehearse material in fantasy or imagination and thus to learn it or integrate it more fully.

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APPENDIX

Outline for PEM Study Adopted for Planning Purposes

(Detailed changes have been made by Task Groups at the discretion of group members.)

1000. PEM Aspects of Child Development

1100. Special Problems in Infancy and Early Childhood (birth to 5 years)

1101. Group care
   1. Effects of orphanage rearing, multiple mothering vs one-to-one mother-child (or surrogate mother) relations
   2. Related effects of environmental complexity

1102. Separation anxiety: fear of the strange

1103. Readiness
   1. General concept
   2. Special application to disadvantaged children

1104. Forced training ("pushing")
   1. In relation to "natural" intellectual limits
   2. In relation to readiness

1105. Sequential organization of learning
   1. In infancy
   2. In early childhood

1106. Parental involvement and influence on early development
   1. Effects of home environment, of implicit theories and practices of parents
   2. Manipulation of parental beliefs and practices, in enrichment programs

1107. Modes of learning and experience that affect early behavioral development
   1. Differential effects on anatomical maturation and behavioral development
   2. Correspondence between rates of anatomical and behavioral development
   3. Effects of environmental (experiential) enrichment and impoverishment, and cumulative effects with increasingly complex circumstances
   4. Hierarchical conceptions of intellectual development (Piaget)
   5. Development of learning sets and their implications for intellectual, motivational, and personality development; resistance of resultant behaviors to extinction
   6. Critical periods

1200. Child Socialization

1201. Conceptualization of the socialization process
   1. Socialization pressures
   2. Learning paradigms: e.g., dependency relations and adult control of "effects" (reinforcement), reference group formation

1202. Internalization of beliefs and values
   1. Conceptualization of attitude, belief, and value systems
   2. Identification processes
   3. Impulse control (self control)
   4. Effects of environmental resources

1203. Cognitive socialization
   1. Psycholinguistic structures, language development: effects on thought, beliefs, attitudes, interests; patterns of expression, values
   2. Uncertainty and information-seeking
   3. Development of expectancies; category accessibility; assimilation; effects on perception, cognition, action
   4. Symbolism, symbolic behavior

1300. Personality Development

1301. Developmental theories (Freud, Erikson, Piaget, Sears)

1302. Developmental sequences, stages
   1. Critical periods
   2. Fluid and crystallized patterns of intelligence (Cattell)

1303. Development of self-identity
   1. Self concept, ego theories, self theories
   2. Relations to social class, racial-ethnic factors, region, sex, family characteristics

1304. Effects of age, sex, culture, and other environmental factors

1305. Development of mechanisms of coping and adaptation

1400. Behavior Change

1401. Personality, learning

1402. Susceptibility to change of personality traits, attitudes, interests, beliefs, values

1403. Measurement of change

1404. Genetic, maturation, and learning factors in physical and psychological growth

2000. Personality

2100. Conceptual and Theoretical Approaches

2101. Criteria for a viable theory

2102. Development of unified, integrated theoretical formulations
   1. Cross-level comparisons and correlations
   2. Developmental histories of stable traits
   3. Relations among trait patterns at various developmental levels
   4. Relations of traits to perceptual responses in person perception and interpersonal interaction

2200. Cognitive Conceptions

2201. Cognitive style, complexity
2202. Balance theories
2203. Cybernetic formulations
    1. Computer simulation of personality
    2. Mathematical models

2300. Developmental Approaches (see 1300)

2400. Dynamic Approaches (see 1303, 4000)

2500. Morphologic Approaches

2600. Physiologic, Psychophysiological, and Biochemical Approaches (see 2102.1)

2700. Trait Structure, Multivariate Approach - Taxonomy of Trait-Explanatory Concepts of Stylistic and Temperament Aspects of Personality
2701. Methodological problems: definition of universes of behaviors for self-report, observation-rating, and objective test studies, cross-media matching of stable structures, design paradigms, including multi-modality designs and trait x treatment designs; construct validation of traits; effects of age, sex, sample, culture, and other environmental effects, and relations of these to resulting trait patterns; the range of roles and sets in relation to diversity of response patterns obtained (social desirability, acquiescence, and other specific sets), their similarities in terms of effects on self-description, and the relations of traits to moderator variables representing such sets
2702. Observational, rating methods: rater and "ratee" sources of effects in peer and "other" ratings, in observational trait assessment, and in interpersonal interaction; explicit concern with task, stimulus presentation, response format, socio-environmental setting, and demographic characteristics of participants; conceptual and empirical relationships among similar and related trait descriptors within observational-rating subdomain and in other subdomains (self-report)
2703. Self-report methods: item pools; format; item vs cluster factorization; measurement of and correction for response bias or distortion; development of a unified, consistent conceptual framework for concepts of personality style and temperament
2704. Objective test, misperceptive, indirect assessment, and development of fresh, new approaches to personality measurement and description

2800. Creativity
2801. Conceptualization of creativity; relations to intelligence, personality factors

2802. Characteristics of the creative person
2803. Analysis of the creative process
2804. Characteristics of the creative product
2805. Characteristics of the creative situation, short- and long-term; situational factors contributing to creative performance
2806. Measurement of creativity

3000. Emotions

3100. State Patterns: Physiological, Cognitive, Behavioral
3101. Arousal stimuli
3102. Response dimensions
3103. Uniqueness
3104. Learned-unlearned dimensions
3105. Affective learning; autonomic and physiological learning

3200. Relations to Traits, Roles

3300. Moderation of Expression by Learning
1. Culture patterns
2. Age, sex, group norms

3400. Drug Effects on Emotional Patterns

3500. Differentiation of States, Reflecting Situational, Organismic, and Stimulus Variations, from Traits, Represented as Long-Term Individual Dispositions

3600. Arousal States: Adrenergic Response, Stress

3700. Dysphoric States: Anxiety, Depression, Guilt, Shame, Remorse (see 4300)

3800. Duphoric States: Happiness, Elation, Joy, Hope, Confidence

4000. Motivation

4100. Conceptualization and Theory (human motivation)
4101. Homeostatic systems, physiological need
4102. Need-press system (Murray), subsystems (n Ach)
4103. Dynamic systems (Freud, Cattell)
4104. Cognitive and cybernetic approaches: motivation inherent in information-processing functions (Hunt), cognitive dissonance theory, incongruity, collative variables (Berlyne), balance theories, exchange theory
4105. Motivation inherent in individual performance, competence motivation (White)
4106. Trait systems and patterns (Guilford, Cattell)
4107. Values systems, moral character
4108. Conceptualization of interest, attitude, need, belief, value, ideal

4200. Process and Trait Formulations
4201. Relations and differences in conception and approach
4202. Process theories and formulations
  1. Balance theories
  2. Exchange theory
4203. Trait formulations: motives, values, character traits
  1. Methodology of measurement: Strong paradigm, Thurstone scales, Likert scales, Cattell's and Campbell's indirect approaches: self-report, objective, misperception, observation, rating, content analysis, unobtrusive measures
  2. Analytic approaches: factor analysis, multidimensional scaling, profile clustering
  3. Factored patterns of sentiments, attitudes, interests, beliefs, values
  4. Variations related to age, sex, sample, culture, and other environmental factors

4300. Frustration, Stress, and Anxiety
4301. Frustration theory and research evidence
4302. Conceptualization of stress
  1. Relation to frustration (Selye)
  2. Utility of stress concept in interpretation of behavior
  3. Relationships among physiological and psychological aspects
  4. Stress and coping, adaptation
4303. Adaptation-Level Theory (Helson) (see 5100)

4400. Conflict
4401. Conceptualization of conflict (Miller, Murphy, Cattell)
  1. Types of conflict: role, value, internal
  2. Approach and avoidance relations
4402. Conflict measurement and calculus
4403. Conflict in relation to interpretation and prediction of action

4500. Interests and Vocational Guidance
4501. Incremental value of interest measurement over ability and aptitude measures in predictions of various criteria on various populations (Thorndike, 10,000 Occupations; Clark, Minnesota study)

5000. Environmental Variables

5100. Conceptualization of Environmental Variables and Their Effects on Behavior; Human Ecology

5200. Methodologies for Encoding Environmental Factors

5300. Taxonomic Systems of Environmental Variables

5400. Normative Studies of Selected Behaviors in Relation to Defined Patterns of Environmental Setting: Sampling Problems in Relation to Populations, Behaviors, Macro- and Micro-Environmental Settings

6000. Interpersonal Behavior Processes

6100. Group Theory, Role Theory, Interpersonal Settings

6200. Interpersonal Perception, Attraction, Influence; Social Acuity, Empathy

7000. Variations in Psychological Processes

7100. Paradigms for such Research, Taking Account of Persons, Tasks, Environmental Settings, and Occasions (Cattell covariation chart, Campbell-Fiske model, longitudinal replication)

7200. Paradigmatic Studies of Selected Learning, Motivation, Perception, and Other Psychological Processes to Investigate Variations Attributable to Shifts in Subject, Task, Setting, and Occasion Dimensions

7201. Analyses to estimate magnitudes of variance components in standard dependent variables accounted for by trait, treatment, and trait by treatment sources and their specific constituents

7202. Analysis of total interaction parameter estimates into principal components or other dimensions in order to compare results by such methods with conventional R, P, Q analysis, both with single dependent variables and vectors (multiple dependent variables)

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